Clipping Weeds Above Crop Canopy Reduces Subsequent Seedling Recruitment

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Background

Weed control is a challenge for organic growers. Organic producers rely on crop rotation, cultural practices, and mechanical weed control to control weeds. Some organic producers have experimented with clipping weeds above the canopy of short stature crops such as lentil or flax. A project was initiated in 1999 to develop or modify equipment for weed clipping and to evaluate whether the practice improved crop yield and/or reduced weed seedling recruitment the following growing season. At Scott, a field experiment was conducted over two years where clipping at various stages of weed development was evaluated. The clipping was done above a lentil crop canopy with a gas-powered hedge trimmer. The Prairie Agriculture Machinery Institute at Humboldt modified the cutting component of a self-propelled swather and carried out field trials on four farmer's fields.

Materials and Methods

Scott Experiment

- Conducted in 1999 and 2000
- Experimental Design: RCBD
- CDC Glamis lentils seeded on May 18, 1999 and May 8, 2000
- Lentil was seeded in 22 cm rows at a rate of 130 kg ha^{-1}
- Wild oat (*Avena fatua* L.) and wild mustard (*Brassica kaber* (DC.) L.C.Wheeler) were seeded at a density of 100 seeds m^{-2} between the crop rows
- Clipping was conducted at the following timings:
    1) Wild mustard in full flower/ Wild oat in boot stage;
    2) Wild mustard podded/ Wild oat headed;
    3) Wild mustard seed filling/ Wild oat mid-dough stage;
    4) Clip at timing 1, 2 and 3.
- A herbicide and an unclipped weedy check were also included.
- Herbicide treatment was a post-emergence sequential application of metribuzin (212 g ai ha^{-1}) sethoxydim (212 g ai ha^{-1}).
  Data collection included crop yield and wild mustard and wild oat seedling emergence the following spring (plants m^{-2}) prior to seeding. In the spring of 2001, lambs quarters (*Chenopodium album* L) emergence was also recorded.

PAMI Field Trials

- Fields were clipped above a lentil or flax crop with a modified swather. Each field had a unclipped check strip.

Results and Discussion

Scott Results

Weed clipping did not result in a detectable lentil yield increase in either year (Figure 1). Clipping must be postponed until the weeds elongate above the crop canopy. Most of the yield loss associated with weed competition occurs in early stages of crop development.

Although variable, clipping reduced subsequent weed seedling emergence. Clipping in 1999 reduced wild oat emergence the following spring if the clipping was done after wild oat heading (Figure 2). In the 2000- 2001 study, low populations of wild oat were present and clipping did not cause a significant reduction in emergence.

There was no detectable difference in wild mustard recruitment in the 1999-2000 study, however there was a trend towards lower densities when the wild mustard was clipped at the podding stage (Figure 3). Many of the pods formed below the crop canopy in the first year of the study, which reduced the efficacy of clipping. Clipping at any stage was effective in reducing wild mustard recruitment in the 2000-2001 study. (Figure 3). Recruitment of lambs-quarters showed similar result (Figure 4).

Field studies

Field studies conducted by PAMI showed similar trends to the Scott trials (Table 1).

Conclusion

While the results are preliminary, weed clipping may have potential as an integrated weed management practice for organic producers. Further study is warranted to define the optimum timing of clipping and to improve consistency of results.

Acknowledgements

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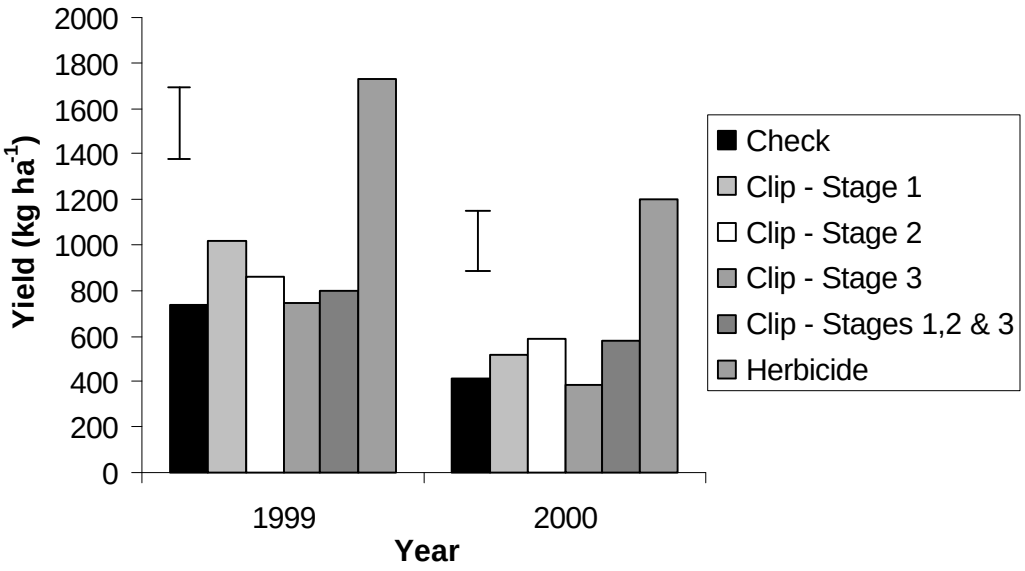

Figure 1: Effect of weed clipping on yield of lentil (kg ha-1). Scott 1999-2000. Error bars represent the $LSD_{0.05}$ within years.

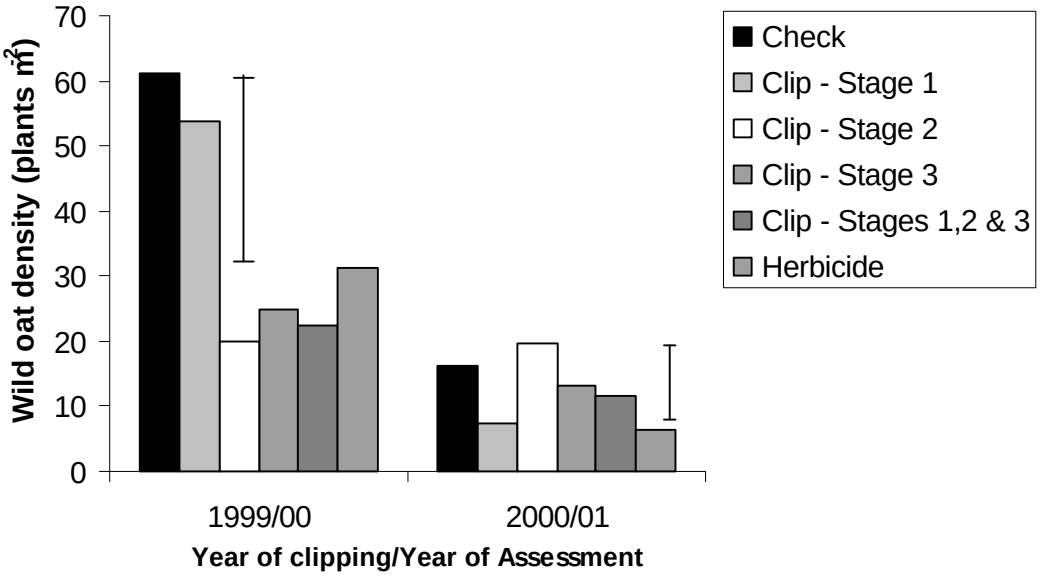

Figure 2: Effect of weed clipping on subsequent wild oat density (plants m-2). Scott 1999-2000. Error bars represent the $LSD_{0.05}$ within years.

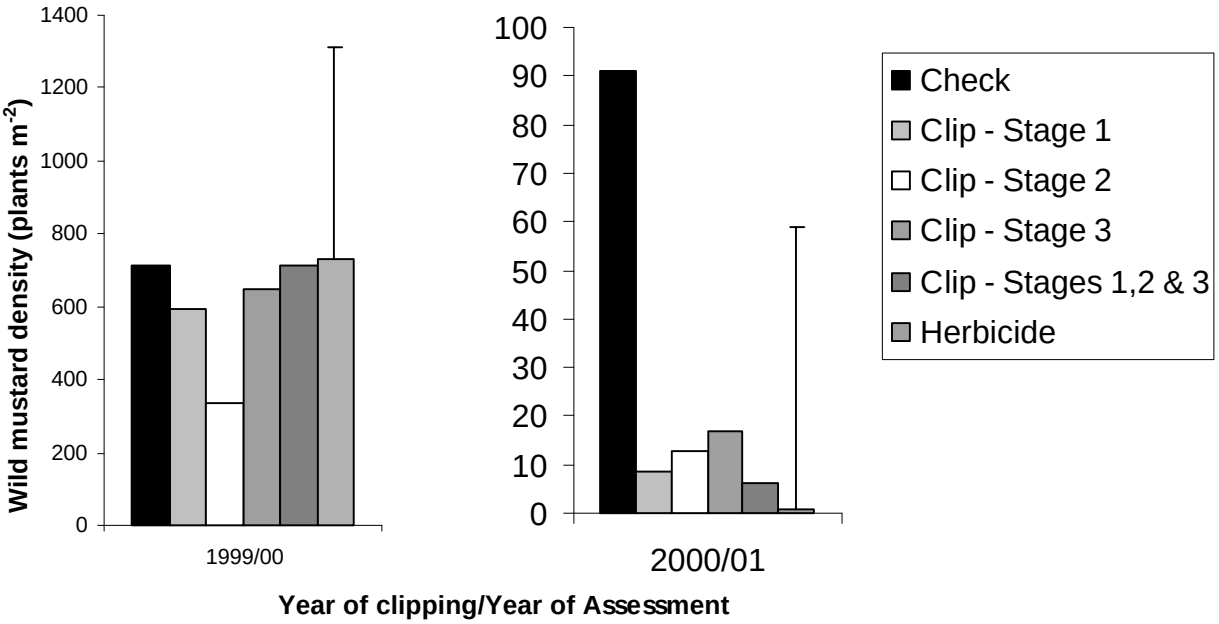

Figure 3 : Effect of weed clipping on subsequent Wild Mustard Density (plants m-2). Scott, 1999-2000. Error bars represent the $LSD_{0.05}$ within years.

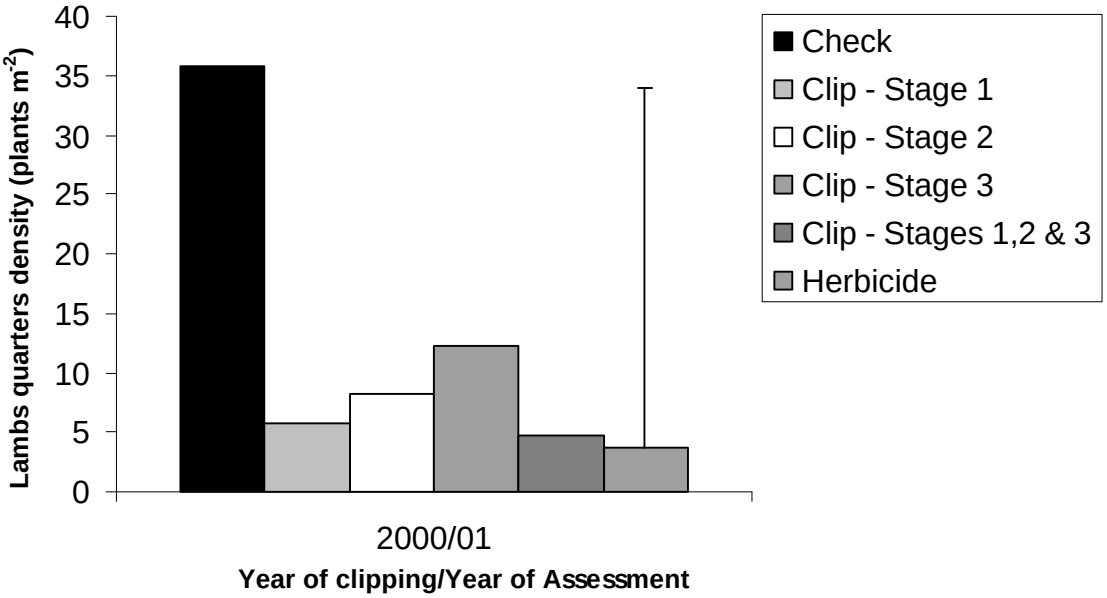

Figure 4 : Effect of weed clipping on subsequent lambsquarters density (plants m-2). Scott, 2000. Error bar represents the $LSD_{0.05}$.

Table 1: Effect of Weed clipping on subsequent wild oat and wild mustard density (plants m^{-2}). Mean of 4 field trials conducted by PAMI. Fields used as replicates to determine LSD. Assessments done in spring of 2001.

	Wild oat density (plants m^{-2})	Wild mustard density (plants m^{-2})
Unclipped	29	17
Clipped	6	6
LSD (P=0.05)	22	21